WHAT IS CLAIMED IS:

1. A method for simultaneously measuring voltage and current in a primary high voltage conductor, the method comprising:

monitoring a current and a voltage on the primary conductor using a current transformer to produce current and voltage information on a secondary winding of the current transformer;

using the voltage information present on the secondary winding to provide a voltage measurement output representative of the voltage present on the primary conductor; and

using the current information present on the secondary winding to provide a current measurement output representative of the current flowing on the high voltage conductor.

2. The method of claim 1 wherein using the voltage information comprises using a capacitive voltage divider including a first capacitance and a second capacitance to provide the voltage measurement output.

3. The method of claim 2 wherein the first capacitance consists of a parasitic capacitance between the high voltage conductor and the secondary winding of the current transformer, and the second capacitance consists of a parasitic capacitance between the secondary winding of the current transformer and a transformer core of the current transformer connected to a reference potential.

4. The method of claim 3 wherein the reference potential is ground.

5. The method of claim 3 wherein the second capacitance has a value from approximately 0.001 microfarads to approximately 10 microfarads.

6. The method of claim 3 further comprising adjusting the second capacitance by adjusting a current transformer geometry.

7. The method of claim 3 further comprising adjusting the second capacitance by adding an external capacitance.

8. The method of claim 3 wherein the second capacitance forms a high pass filter network in combination with a drain resistor connected between the current transformer secondary winding and the reference potential.

9. The method of claim 8 wherein a cutoff frequency of the filter is set between approximately 1 hertz and approximately 0.001 hertz.

10. The method of claim 1 wherein using the current information comprises using an auxiliary transformer to provide the current measurement output.

11. The method of claim 1 wherein using the current information comprises using an operational amplifier and burden resistor to provide the current measurement output.

12. The method of claim 1 further comprising measuring a neutral current of a multi-phase system.

13. The method of claim 12 wherein measuring the neutral current comprises using a transformer including a separate winding for each phase.

14. The method of claim 1 further comprising protecting the current transformer secondary winding from insulation failure induced by a transient voltage.

15. The method of claim 14 wherein protecting the current transformer comprises using a surge suppressor connected between the current transformer secondary winding and a reference potential.

16. The method of claim 1 further comprising canceling from the voltage measurement crosstalk introduced by one or more additional voltage phases in a multi-phase system by:

obtaining an additional phase voltage measurement for each of the one or more additional phases of the multi-phase system;

generating a product for each additional phase by multiplying each additional phase voltage measurement by a corresponding predetermined constant; and

subtracting from the voltage measurement the product for each additional phase.

17. The method of claim 16 wherein the multi-phase system comprises three phases, such that there are two additional phases.

18. The method of claim 2 wherein the first capacitance comprises a parasitic capacitance between the high voltage conductor and the secondary winding of the current transformer, and the second capacitance comprises a parasitic capacitance between the secondary winding of the current transformer and a transformer core of the current transformer connected to a reference potential.

19. An apparatus for simultaneously measuring voltage and current in a primary high voltage conductor, the apparatus comprising:

a current transformer comprising a secondary winding and a transformer core, the current transformer being electro-magnetically coupled to a high voltage conductor;

a capacitive voltage divider comprising a first capacitance between the high voltage conductor and the secondary winding of the current transformer and a second capacitance between the secondary winding of the current transformer and the transformer core;

a voltage measurement circuit connected to the current transformer; and

a current measurement circuit connected to the current transformer.

20. The simultaneous voltage and current measuring apparatus of claim 19 wherein the first capacitance consists of a parasitic capacitance between the high voltage conductor and the secondary winding and the second capacitance consists of a parasitic capacitance between the secondary winding and the transformer core.

21. The simultaneous voltage and current measuring apparatus of claim 20 wherein the transformer core is connected to a reference potential.

22. The simultaneous voltage and current measuring apparatus of claim 21 wherein the reference potential is ground.

23. The simultaneous voltage and current measuring apparatus of claim 20 wherein the second capacitance has a value from approximately 0.001 microfarads to approximately 10 microfarads.

24. The simultaneous voltage and current measuring apparatus of claim 21 wherein the second capacitance forms a high pass filter network in combination with a drain resistor connected between the current transformer secondary winding and the reference potential.

25. The simultaneous voltage and current measuring apparatus of claim 24 wherein a cutoff frequency of the filter is set between approximately 1 hertz and approximately 0.001 hertz.

26. The simultaneous voltage and current measuring apparatus of claim 19 wherein the current measurement circuit comprises an auxiliary transformer.

27. The simultaneous voltage and current measuring apparatus of claim 19 wherein the current measurement circuit comprises:

an operational amplifier including a first input terminal connected to the current transformer and a second input terminal connected to the ground; and

a burden resistor connected between the first input terminal and the second input terminal of the operational amplifier.

28. The simultaneous voltage and current measuring apparatus of claim 27 further comprising a surge protection device connected between the current transformer and ground.

29. The simultaneous voltage and current measuring apparatus of claim 19 wherein the voltage measurement circuit comprises:

an operational amplifier including a first input terminal, a second terminal connected to ground, and an output terminal;

a drain resistor connected between the first input terminal of the operational amplifier and the second input terminal of the operational amplifier;

a first resistor connected between the first input terminal of the operational amplifier and a first terminal of the current transformer; and

a second resistor connected between the first input terminal of the operational amplifier and a second terminal of the current transformer.

30. The simultaneous voltage and current measuring apparatus of claim 29 further comprising a surge protection device connected between the current transformer and ground.

31. The simultaneous voltage and current measuring apparatus of claim 19 wherein the first capacitance comprises a parasitic capacitance between the high voltage conductor and the secondary winding and the second capacitance comprises a parasitic capacitance between the secondary winding and the transformer core.

32. An apparatus for simultaneously measuring voltage and current in a primary high voltage conductor for each individual phase in a multi-phase system and for measuring a neutral current of the multi-phase system, the apparatus comprising:

a current transformer associated with each individual phase in the multi-phase system, each current transformer comprising a secondary winding and a transformer core, and each current transformer being electro-magnetically coupled to a high voltage conductor for the associated phase;

a capacitive voltage divider associated with each individual phase in the multi-phase system, each capacitive voltage divider comprising a first capacitance between the high voltage conductor corresponding to the associated phase and the secondary winding of the current transformer for that phase, and a second capacitance between the secondary winding and the transformer core of the associated current transformer for that phase;

a voltage measurement circuit associated with each individual phase in the multi-phase system, each voltage measurement circuit being connected to the current transformer for the associated phase;

a current measurement circuit associated with each individual phase in the multi-phase system, each current measuring circuit being connected to the current transformer for the associated phase; and

a neutral current measuring circuit connected to the current transformers.

33. The apparatus of claim 32 wherein, for each capacitive voltage divider, the first capacitance consists of a parasitic capacitance between the associated high voltage conductor and the secondary winding, and the second capacitance consists of a parasitic capacitance between the secondary winding and the transformer core.

34. The apparatus of claim 33 wherein, for each capacitive voltage divider, the transformer core is connected to a reference potential.

35. The apparatus of claim 34 wherein the reference potential is ground.

36. The apparatus of claim 33 wherein the second capacitance has a value from approximately 0.001 microfarads to approximately 10 microfarads.

37. The apparatus of claim 34 wherein the second capacitance forms a high pass filter network in combination with a drain resistor connected between the current transformer secondary winding and the reference potential.

38. The apparatus of claim 37 wherein a cutoff frequency of the filter is set between approximately 1 hertz and approximately 0.001 hertz.

39. The apparatus of claim 32 wherein each current measurement circuit comprises an auxiliary transformer.

40. The apparatus of claim 32 wherein each current measurement circuit comprises:

an operational amplifier including a first input terminal connected to the current transformer and a second input terminal connected to ground; and

a burden resistor connected between the first input terminal and the second input terminal of the operational amplifier.

41. The apparatus of claim 40 further comprising a surge protection device connected between each current transformer and ground.

42. The apparatus of claim 32 wherein each voltage measurement circuit further comprises:

an operational amplifier including a first input terminal, a second terminal connected to ground, and an output terminal;

a drain resistor connected between the first input terminal of the operational amplifier and the second input terminal of the operational amplifier;

a first resistor connected between the first input terminal of the operational amplifier and a first terminal of the current transformer; and

a second resistor connected between the first input terminal of the operational amplifier and a second terminal of the current transformer.

43. The apparatus of claim 42 further comprising a surge protection device connected between each current transformer and ground.

44. The apparatus of claim 32 wherein the neutral current measuring circuit comprises a transformer, the transformer including a secondary winding for each individual phase of the multi-phase system.

45. The apparatus of claim 32 further comprising a crosstalk cancellation circuit connected to the voltage measurement circuit associated with each individual phase in the multi-phase system, wherein the crosstalk cancellation circuit is connected to receive a voltage measurement input for each individual phase associated with the multi-phase system and to correct a voltage measurement to account for crosstalk between the phases.

46. The apparatus of claim 45 wherein the crosstalk cancellation circuit comprises:

an operational amplifier including a first input terminal, a second input terminal, and an output terminal;

a voltage input associated with an individual phase of the multi-phase system connected to the first input terminal of the operational amplifier;

a resistor associated with each additional phase of the multi-phase system connected between a voltage input for the associated additional phase and the second input terminal of the operational amplifier; and

a connecting resistor connected between the second input terminal of the operational amplifier and the output of the operational amplifier.

47. The apparatus of claim 46 wherein the multi-phase system comprises three phases, such that there are two additional phases.

48. The apparatus of claim 47 wherein:

the voltage input associated with an individual phase of the multi-phase system further comprises a voltage input associated with a first phase; and

the resistor associated with each additional phase further comprises:

a first resistor associated with a second phase connected between a voltage input for the second phase and the second input terminal of the operational amplifier; and

a second resistor associated with a third phase connected between a voltage input for the third phase and the second input terminal of the operational amplifier.

49. The apparatus of claim 32 wherein the multi-phase system comprises three phases.

50. The apparatus of claim 32 wherein, for each capacitive voltage divider, the first capacitance comprises a parasitic capacitance between the associated high voltage conductor and the secondary winding, and the second capacitance comprises a parasitic capacitance between the secondary winding and the transformer core.

51. The apparatus of claim 50 wherein the transformer core is connected to a reference potential.

52. An apparatus for simultaneously measuring voltage and current in a primary high voltage conductor, the apparatus comprising:

a current transformer comprising a secondary winding and a transformer core, the current transformer being electro-magnetically coupled to a high voltage conductor;

a capacitive voltage divider comprising a first capacitance between the high voltage conductor and the secondary winding of the current transformer and a second capacitance between the secondary winding of the current transformer and the transformer core;

means for measuring voltage in the primary high voltage conductor using the current transformer; and

means for measuring current in the primary high voltage conductor using the current transformer.

53. The simultaneous voltage and current measuring apparatus of claim 52 wherein the first capacitance consists of a parasitic capacitance between the high voltage conductor and the secondary winding and the second capacitance consists of a parasitic capacitance between the secondary winding and the transformer core.

54. The simultaneous voltage and current measuring apparatus of claim 52 wherein the first capacitance comprises a parasitic capacitance between the high voltage conductor and the secondary winding and the second capacitance comprises a parasitic capacitance between the secondary winding and the transformer core.

55. An apparatus for simultaneously measuring voltage and current in a primary high voltage conductor for each individual phase in a multi-phase system and for measuring a neutral current of the multi-phase system, the apparatus comprising:

a current transformer associated with each individual phase in the multi-phase system, each current transformer comprising a secondary winding and a transformer core, and each

current transformer being electro-magnetically coupled to a high voltage conductor for the associated phase;

a capacitive voltage divider associated with each individual phase in the multi-phase system, each capacitive voltage divider comprising a first capacitance between the high voltage conductor corresponding to the associated phase and the secondary winding of the current transformer for that phase and a second capacitance between the secondary winding and the transformer core of the associated current transformer for that phase;

means for measuring voltage in the primary high voltage conductor for each individual phase in the multi-phase system using the current transformers;

means for measuring current in the primary high voltage conductor for each individual phase in the multi-phase system using the current transformers; and

means for measuring a neutral current using the current transformers.

56. The apparatus of claim 55 wherein, for each capacitive voltage divider, the first capacitance consists of a parasitic capacitance between the associated high voltage conductor and the secondary winding and the second capacitance consists of a parasitic capacitance between the secondary winding and the transformer core.

57. The apparatus of claim 56, wherein the transformer core is connected to a reference potential.

58. The apparatus of claim 55 further comprising means for canceling crosstalk connected to the means for measuring voltage associated with each individual phase in the multi-phase system, wherein the means for canceling crosstalk is connected to receive a voltage measurement input for each individual phase associated with the multi-phase system and to correct a voltage measurement to account for crosstalk between the phases.

59. The apparatus of claim 55 wherein the multi-phase system comprises three phases.

60. The apparatus of claim 55 wherein, for each capacitive voltage divider, the first capacitance comprises a parasitic capacitance between the associated high voltage conductor

and the secondary winding and the second capacitance comprises a parasitic capacitance between the secondary winding and the transformer core.